In the Claims

Please amend claims 4, 5, 6, 7, 10, 11, 12, 13, 14, 16, 17, 18 and 19 as indicated in the attached Claims Listing.

A complete Claims Listing showing all claims presently pending in the application, and indicating the present status of each claim, is attached as required under 37 C.F.R. § 1.121(c).

Claims Listing :

1. (Original) A projection objective for short wavelengths, in particular for wavelengths $\lambda < 157$ nm, having a number of mirrors that are arranged positioned precisely in relation to an optical axis, and wherein the mirrors have multilayer coatings, characterized in that there are provided for the mirrors at least two different mirror materials that differ in the rise in coefficient of thermal expansion as a function of the temperature in the region of the zero crossing of the coefficients of thermal expansion, in particular in the sign of the rise.

2. (Original) The projection objective as claimed in claim 1, wherein a rise in coefficients of thermal expansion of below 100 ppb/K^2, in particular below 10 ppb/K^2, in absolute terms is provided.

3. (Original) The projection objective as claimed in claim 1 or 2, wherein the zero crossing temperature is located in a range between 0 to 100°C, in particular between 10 to 50°C.

4. (Currently Amended) The projection objective as claimed in claim 1, [characterized by use in the] wherein said wavelengths comprise EUV region [[with]] wavelengths $\lambda < 20$ nm.

5. (Currently Amended) The projection objective as claimed in claim 1, wherein at least one [mirror (M1, M2, M3, M4, M5, M6)] of said mirrors is made from a glass ceramic material [is provided], and at least one [mirror (M1, M2, M3, M4, M5, M6)] of said mirrors is made from an amorphous titanium silicate glass [is provided].

6. (Currently Amended) The projection objective as claimed in claim 5, wherein the sign of the rise in the coefficient of thermal expansion of the glass ceramic material is [ZERODUR®] negative in the region of the zero crossing of the coefficient of thermal expansion of the glass ceramic material.

7. (Currently Amended) The projection objective as claimed in claim 5, wherein the sign of the rise in the coefficient of thermal expansion of the amorphous titanium silicate glass is [ULE®] positive in the region of the zero crossing of the region of the zero crossing of the coefficient of thermal expansion of the amorphous titanium silicate glass.

8. (Original) The projection objective as claimed in claim 5, wherein the glass ceramic material is provided for mirrors with large beam cross sections.

9. (Original) The projection objective as claimed in claim 5, wherein the glass ceramic material is provided for mirrors in the objective region remote from the wafer.

10. (Currently Amended) The projection objective as claimed in claim 1, characterized by an assembly of mirrors [(M1, M2, M3, M4, M5, M6)] that are arranged with regard to their mirror materials in a fashion minimizing thermally induced aberrations.

11. (Currently Amended) The projection objective as claimed in claim 1, characterized by an assembly of mirrors [(M1, M2, M3, M4, M5, M6)] that are arranged with regard to their mirror materials so as to optimize a scattered light distribution in a wafer plane [[(3)]].

12. (Currently Amended) The projection objective as claimed in claim 1, characterized by an assembly of mirrors [(M1, M2, M3, M4, M5, M6)] that are arranged with regard to their mirror materials in such as a way as to provide a minimization of wavefront errors caused by CTE inhomogeneities.

13. (Currently Amended) A projection exposure apparatus for EUV lithography comprising optical components, in particular mirrors, reticles or beam splitters,

characterized in that provided for the optical components [(M1, M2, M3, M4, M5, M6)] are at least two different substrate materials that differ in the rise of the coefficient of thermal expansion as a function of temperature in the region of zero crossing of the coefficients of thermal expansion, in particular in the sign of the rise.

14. (Original) The projection exposure apparatus as claimed in claim 13, wherein a rise in coefficients of thermal expansion of below 100 ppb/K^2, in particular below 10 ppb/K^2, in absolute terms is provided.

15. (Original) The projection exposure apparatus as claimed in claim 13 or 14, wherein the zero crossing temperature has a range of between 0 to 100°C, in particular between 10 to 50°C.

16. (Currently Amended) The projection exposure apparatus as claimed in claim 13, wherein at least one optical component [(M1, M2, M3, M4, M5, M6)] made from a glass ceramic material is provided, and at least one optical component [(M1, M2, M3, M4, M5, M6)] made from an amorphous titanium silicate glass is provided.

17. (Currently Amended) The projection exposure apparatus as claimed in claim 13, characterized by an assembly of optical components [(M1, M2, M3, M4, M5, M6)] that are arranged with regard to their substrate materials in a fashion reducing thermally induced aberrations.

18. (Currently Amended) The projection exposure apparatus as claimed in claim 13, characterized by an assembly of optical components [(M1, M2, M3, M4, M5, M6)] that are arranged with regard to their substrate materials so as to optimize a scattered light distribution in a wafer plane [[(3)]].

19. (Currently Amended) The projection exposure apparatus as claimed in claim 13, characterized by an assembly of optical components [(M1, M2, M3, M4, M5, M6)]

that are arranged with regard to their substrate materials in such as a way as to provide a minimization of wavefront errors caused by CTE inhomogeneities.

20. (Original) An X-ray optical subsystem, in particular mirror, reticle or beam splitter, for X-radiation of wavelength λ_R, characterized by at least two different substrate materials that differ in the rise in coefficient of thermal expansion as a function of temperature in the region of the zero crossing of the coefficients of thermal expansion, in particular in the sign of the rise.

21. (Original) The X-ray optical subsystem as claimed in claim 20, wherein the wavelength is $\lambda_R < 200$ nm, in particular $\lambda_R < 157$ nm.

22. (Original) The X-ray optical subsystem as claimed in claim 20, wherein the substrate material is a glass ceramic material.

23. (Original) The X-ray optical subsystem as claimed in claim 20, wherein the substrate material is a titanium silicate glass.

24. (Original) An X-ray optical subsystem for a projection objective in accordance with one of claims 8 to 12.

25. (Original) Use of X-ray optical subsystems as claimed in one of claims 20 to 23 in X-ray microscopy, X-ray astronomy or X-ray spectroscopy.